

WHAT IS CLAIMED IS:

1           1.       A program storage device readable by a computer, the medium tangibly  
2       embodying one or more programs of instructions executable by the computer to perform  
3       a method for determining a size of a last data block processed in a storage system, the  
4       method comprising:  
5           detecting a characteristic of a data channel gate signal indicating a length of data;  
6           determining the length of data based on the detection of the characteristic; and  
7           calculating a size of a last data block in the length of data based on the determined  
8       length.

1           2.       The program storage device of claim 1, wherein the detecting the  
2       characteristic of the data channel gate signal further comprises detecting a transition of a  
3       read-gate signal and a write-gate signal for indicating the last data block in the length of  
4       data.

1           3.       The program storage device of claim 2, wherein the detecting the  
2       transition of the write-gate signal further comprises detecting a de-assertion of write-gate  
3       signal  $MI$  bytes before the end of a data sector being written to provide the size of the last  
4       data block ( $R$ ), the size of the last data block ( $R$ ) equals  $\text{MOD}(K+MI L)$ , wherein  $K$  is a  
5       determined length count number,  $K+MI$  equals the sector size  $N$  and  $L$  equals a codeword  
6       size.

1           4.       The program storage device of claim 2, wherein the detecting the  
2 transition of the read-gate signal further comprises detecting a de-assertion of read-gate  
3 signal  $M2$  bytes before the end of a data sector being read to provide the size of the last  
4 data block ( $R$ ), the size of the last data block ( $R$ ) equals  $\text{MOD}(K+M2, L)$ , wherein  $K$  is a  
5 determined length count number,  $K+M2$  equals the sector size  $N$  and  $L$  equals a codeword  
6 size.

1           5.       The program storage device of claim 2 further comprising decoding the  
2 last data block after reading the last data block from a medium.

1           6.       The program storage device of claim 5, wherein the decoding the last data  
2 block further comprises using parity post-processing and run-length-limited decoding  
3 schemes.

1           7.       The program storage device of claim 1, wherein the calculating the size of  
2 a last data block further comprises calculating a modulo ( $\text{MOD}$ ) of sector size ( $N$ ) and  
3 codeword size ( $L$ ) to provide the size of the last data block ( $R$ ), wherein the size of the  
4 last data block ( $R$ ) equals  $\text{MOD}(N, L)$ .

1           8.       The program storage device of claim 1 further comprising encoding the  
2 last data block before writing the last data block to a medium.

1           9.       The program storage device of claim 8, wherein the encoding the last data  
2 block further comprises using parity and run-length-limited encoding schemes.

1           10.     The program storage device of claim 1 further comprising applying parity  
2     encoding/decoding on the last data block without padding additional bytes.

1           11.     A read/write channel device comprising:  
2             a signal processor for detecting a characteristic of a data channel gate signal  
3     indicating a length of data; and  
4             a counter for determining the length of the data based on the detection of the  
5     characteristic and for calculating the size of a last data block in the length of data based  
6     on the determined length.

1           12.     The read/write channel device of claim 11, wherein the signal processor  
2     further comprises a read-gate and a write-gate for indicating the last data block in the  
3     length of data.

1           13.     The read/write channel device of claim 12, wherein the write-gate  
2     provides a signal  $M1$  bytes before the end of a data sector being written to provide the  
3     size of the last data block ( $R$ ), the size of the last data block ( $R$ ) equals  $\text{MOD}(K+M1, L)$ ,  
4     wherein  $K+M1$  equals the sector size  $N$  and  $L$  equals a codeword size.

1           14.     The read/write channel device of claim 12, wherein the read-gate provides  
2     a signal  $M2$  bytes before the end of a data sector being read to provide the size of the last  
3     data block ( $R$ ), the size of the last data block ( $R$ ) equals  $\text{MOD}(K+M2, L)$ , wherein  $K+$   
4      $M2$  equals the sector size  $N$  and  $L$  equals a codeword size.

1           15.    The read/write channel device of claim 11 further comprising a decoder  
2   for decoding the last data block after reading the last data block from a medium.

1           16.    The read/write channel device of claim 15, wherein the decoder further  
2   comprises a post-processor for providing parity post-processing and a channel decoder  
3   for providing run-length-limited decoding schemes.

1           17.    The read/write channel device of claim 11, wherein the counter calculates  
2   a modulo (MOD) of sector size ( $N$ ) and codeword size ( $L$ ) to provide the size of the last  
3   data block ( $R$ ), wherein the size of the last data block ( $R$ ) equals MOD ( $N, L$ ).

1           18.    The read/write channel device of claim 11 further comprising an encoder  
2   for encoding the last data block before writing the last data block to a medium.

1           19.    The read/write channel device of claim 18, wherein the encoder further  
2   comprises a channel encoder and a parity encoder for providing parity and run-length-  
3   limited processing.

1           20.    The read/write channel device of claim 11 further comprising an  
2   encoder/decoder for applying parity on the last data block without padding additional  
3   bytes.

1           21.     A storage system for determining sector block sizes using existing  
2 controller signals, comprising:  
3           a storage medium for storing data thereon, the storage medium formatted for a  
4 predetermined sector length;  
5           a transducer, operatively coupled to the storage medium, for reading and writing  
6 data on the storage medium; and  
7           a read/write channel device for determining a size of a last data block, comprising  
8           a signal processor for detecting a characteristic of a data channel gate  
9 signal indicating a length of data; and  
10           a counter to determine the length of the data based on the detection of the  
11 characteristic and to calculate the size of the last data block in the length of data based on  
12 the determined length.

1           22.     The storage system of claim 21 further comprising a storage controller for  
2 generating both a write-gate signal and a read-gate signal to the read/write channel, and  
3 for generating NRZ data to read/write channel for writing and for receiving NRZ data  
4 from read/write channel for reading.

1           23.     The storage system of claim 21, wherein the signal processor further  
2 comprises a write-gate and a read-gate for indicating the last data block in the length of  
3 data.

1           24.     The storage system of claim 23, wherein the write-gate provides a signal  
2      $M1$  bytes before the end of a data sector being written to provide the size of the last data  
3     block ( $R$ ), the size of the last data block ( $R$ ) equals  $\text{MOD}(K + M1, L)$ , wherein  $K + M1$   
4     equals the sector size and  $L$  equals a codeword size.

1           25.     The storage system of claim 23, wherein the read-gate provides a signal  
2      $M2$  bytes before the end of a data sector being read to provide the size of the last data  
3     block ( $R$ ), the size of the last data block ( $R$ ) equals  $\text{MOD}(K + M2, L)$ , wherein  $K + M2$   
4     equals the sector size and  $L$  equals a codeword size.

1           26.     The storage system of claim 21 further comprising a decoder for decoding  
2     the last data block after reading the last data block from a medium.

1           27.     The storage system of claim 26, wherein the decoder further comprises a  
2     post-processor for providing parity post-processing and a channel decoder for providing  
3     run-length-limited decoding schemes.

1           28.     The storage system of claim 21, wherein the counter calculates a modulo  
2     ( $\text{MOD}$ ) of sector size ( $N$ ) and codeword size ( $L$ ) to provide the size of the last data block  
3     ( $R$ ), wherein the size of the last data block ( $R$ ) equals  $\text{MOD}(N, L)$ .

1           29.     The storage system of claim 21 further comprising an encoder for  
2     encoding the last data block before writing the last data block to a medium.

1           30.     The storage system of claim 29, wherein the encoder further comprises a  
2     channel encoder and a parity encoder for providing parity and run-length-limited  
3     processing.

1           31.     A storage system for determining the size of a last data block processed in  
2     a storage system comprising:  
3                 means for detecting a characteristic of a data channel gate signal indicating a  
4     length of data;  
5                 means for determining the length of data based on the detection of the  
6     characteristic; and  
7                 means for calculating the size of a last data block in the length of data based on  
8     the determined length.

1           32.     A method of determining a size of a last data block processed in a storage  
2     system comprising:  
3                 detecting a characteristic of a data channel gate signal indicating a length of data;  
4                 determining the length of data based on the detection of the characteristic; and  
5                 calculating a size of a last data block in the length of data based on the determined  
6     length.